

Appl. No. 09/720,623
AMENDMENT
Docket No. MAEJ-136

Amendments to the Claims:

This listing of claims will replace all prior listings of claims. Please amend Claims 1-3, 7, and 9-10 and add new Claim 11.

Listing of Claims:

1. (Currently Amended) A process for producing hydrocarbon-phenol resin by the reaction of a phenolic compound and an unsaturated cyclic hydrocarbon having two or more carbon-carbon double bonds in the presence of an acid catalyst, which process comprises the following steps (1) and (2):

step (1) adjusting the molar ratio of the amount of ~~ether-type~~ ether product relative to that of the whole product to 0.1 or more, and

step (2) extinguishing substantially the ~~ether-type~~ ether product formed in said step (1) by proceeding with said reaction.

2. (Currently Amended) A process for producing hydrocarbon-phenol resin by the reaction of a phenolic compound and an ~~unsaturated cyclic hydrocarbon having two or more carbon-carbon double bonds~~ dicyclopentadiene in the presence of an acid catalyst, which process comprises the following steps (1) and (2):

step (1) carrying out the reaction in the range of 50°C to 90°C or, if the melting point of the phenolic compound is higher than 50°C, in the range from the melting point of the phenolic compound to 90°C, while adding the ~~unsaturated cyclic hydrocarbon having two or more carbon-carbon double bonds~~ dicyclopentadiene to the phenolic compound intermittently or continuously, and

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step (2) after addition of ~~said unsaturated cyclic hydrocarbon~~ the dicyclopentadiene, increasing the temperature to 110°C or higher so as to continue the reaction further.

3. (Currently Amended) A process for producing hydrocarbon-phenol resin as claimed in Claim 1, wherein the ratio of ~~ortho-type/para-type~~ ortho/para is 2.0 or more with regard to the substitution position of the unsaturated cyclic hydrocarbon relative to a hydroxyl group of the phenolic compound in said hydrocarbon-phenol resin.

4. (Previously Presented) A process for producing hydrocarbon-phenol resin as claimed in Claim 1, wherein after said reaction, catalyst is deactivated and then unreacted phenolic compound is recovered.

5. (Previously Presented) A process for producing hydrocarbon-phenol resin as claimed in Claim 1, wherein said phenolic compound is phenol and said unsaturated cyclic hydrocarbon having two or more carbon-carbon double bonds is dicyclopentadiene.

6. (Previously Presented) A process for producing epoxy resin, which comprises the steps of reacting the hydrocarbon-phenol resin obtained by the process as claimed in Claim 1, with epihalohydrin in the presence of a base catalyst, then removing residual catalyst, and removing unreacted epihalohydrin.

7. (Currently Amended) A process for producing hydrocarbon-phenol resin as ~~claimed in Claim 2, by the reaction of a phenolic compound and an unsaturated cyclic~~

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hydrocarbon having two or more carbon-carbon double bonds in the presence of an acid catalyst, which process comprises the following steps (1) and (2):

step (1) carrying out the reaction in the range of 50°C to 90°C or, if the melting point of the phenolic compound is higher than 50°C, in the range from the melting point of the phenolic compound to 90°C, while adding the unsaturated cyclic hydrocarbon having two or more carbon-carbon double bonds to the phenolic compound intermittently or continuously, and

step (2) after addition of the unsaturated cyclic hydrocarbon, increasing the temperature to 110°C or higher so as to continue the reaction further,

wherein the ratio of ortho-type/para-type ortho/para is 2.0 or more with regard to the substitution position of the unsaturated cyclic hydrocarbon relative to a hydroxyl group of the phenolic compound in said hydrocarbon-phenol resin.

8. (Previously Presented) A process for producing hydrocarbon-phenol resin as claimed in Claim 2, wherein after said reaction, catalyst is deactivated and then unreacted phenolic compound is recovered.

9. (Currently Amended) A process for producing hydrocarbon-phenol resin as claimed in Claim 2, wherein said phenolic compound is phenol and ~~said unsaturated cyclic hydrocarbon having two or more carbon-carbon double bonds is dicyclopentadiene.~~

10. (Currently Amended) A process for producing epoxy resin, which comprises the steps of:

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producing a hydrocarbon-phenol resin by the reaction of a phenolic compound and an unsaturated cyclic hydrocarbon having two or more carbon-carbon double bonds in the presence of an acid catalyst.

wherein the reaction is in the range of 50°C to 90°C or, if the melting point of the phenolic compound is higher than 50°C, in the range from the melting point of the phenolic compound to 90°C, and wherein the unsaturated cyclic hydrocarbon having two or more carbon-carbon double bonds is added to the phenolic compound intermittently or continuously.

after addition of the unsaturated cyclic hydrocarbon, increasing the temperature to 110°C or higher so as to continue the reaction, and

reacting the obtained hydrocarbon-phenol resin obtained by the process as claimed in Claim 2, with epihalohydrin in the presence of a base catalyst,
then removing residual catalyst, and
removing unreacted epihalohydrin.

11. (NEW) A process for producing hydrocarbon-phenol resin, comprising:
reacting a phenolic compound and an unsaturated cyclic hydrocarbon having two or more carbon-carbon double bonds in the presence of an acid catalyst to form a hydrocarbon-phenol resin and an ether by-product;
adjusting the molar ratio of the amount of the ether by-product relative to that of the hydrocarbon-phenol resin to 0.1 or more, and
proceeding with said reacting of the phenolic compound and the unsaturated cyclic hydrocarbon at an increased temperature, thereby substantially decreasing the amount of the ether by-product.